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**MAMMALS COLLECTED BY DR. A. DONALDSON SMITH DURING HIS
EXPEDITION TO LAKE RUDOLF, AFRICA.¹**

BY SAMUEL N. RHOADS.

In the following annotated list of the mammals collected by Dr. A. Donaldson Smith during his African expedition of 1894-'95 across Somaliland to Lake Rudolf, I have included all the species coming under my observation which were brought back by Dr. Smith to Philadelphia.

The greater part of the collection was most generously given to the Academy of Natural Sciences of Philadelphia, but a large part of the skulls, mounted heads and skins of the larger game have been reserved by Dr. Smith, and at present form an exhibition at the University of Pennsylvania. Those species in the list not represented in the donation to the Academy are preceded by an asterisk.

The entire collection represents 50 genera and 77 species,² seven of which are here described as new.

Dr. Smith is to be congratulated on having brought to Philadelphia by far the largest, most comprehensive and best preserved faunal collection of African mammals ever acquired by an American institution, and not only many species, but several genera are for the first time made accessible to students on this side of the Atlantic.

Owing to the almost total lack of specimens in this country for comparison, and the widely scattered literature relating to African mammalogy, the author has been severely handicapped in his study of the collection, and it is hoped that the paper, as now presented, will be judged accordingly.

¹ At the request of Dr. Smith this paper was originally prepared for publication in his forthcoming book on the Lake Rudolf expedition. Less than three months were allotted the writer for its preparation. The mss. was subsequently returned, with other papers of scientific character intended for the work, on account of lack of space and was then accepted for publication in the Proceedings of the Academy of Natural Sciences of Philadelphia.

² This includes four genera and five species of bats, which have been worked up by Dr. Harrison Allen in a separate paper, viz : *Megaderma frons*, *Megaderma cor*, *Nycteris capensis*, *Scotophilus minimus* and *Adelonycteris* sp. ?

***1. *Hippopotamus amphibius* L.** Hippopotamus.

A skull and several incisor teeth are in the University of Pennsylvania series.

***2. *Phacochoerus africanus* (Gmel.).** Ælian's Wart Hog.

A skull and a mounted head are in the University of Pennsylvania exhibit.

***3. *Giraffa camelopardalis* (L.).** Ethiopian Giraffe.

The skull of a female, with full head and neck skin to shoulders, was mounted at the Academy of Natural Sciences of Philadelphia. It exhibits the peculiarities defined by Mr. Thomas³ for the northern form. The application to this form of the name *æthiopica* of Sundevall⁴ is, however, incorrect, as the *camelopardalis* of Linnæus is assigned by that author to "Æthiopia and Sennar."⁵ This makes Sundevall's name a synonym, the southern race remaining, so far as I can ascertain, unnamed. I would propose for the latter the name *Giraffa camelopardalis australis*, *Nom. nov.*

***4. *Bubalis swaynei* Sel.** Swayne's Hartebeest.

Represented by five (?) skulls in the University of Pennsylvania series.

5. *Bubalis cokei* (Günth.). Coke's Hartebeest.

One pair of horns in the collection of the Academy of Natural Sciences of Philadelphia (No. 3,933), and four mounted heads in the University of Pennsylvania.

***6. *Damaliscus jimela* (Mtsch.).** Topi Antelope.

One mounted head and one skull in the University of Pennsylvania represent this species.

7. *Madoqua guentheri* Thos. Gunther's Dik-dik.

A mounted male specimen, entire, with skull separate, in the Academy of Natural Sciences of Philadelphia series (No. 3,900), belongs to this very distinct species. While the colors of the back and head closely resemble those of the following (*M. phillipsi*), the tawny ochraceous tints of the belly of *phillipsi* constantly distinguish it from the white bellied *guentheri*. In the Academy's specimen of the latter, the back is quite as gray as in Thomas' and Sclater's figure of *phillipsi*,⁶ not rufous, as there figured.

³ Proc. Zool. Soc., 1894, p. 135.

⁴ K. Vet. Akad. Handl., 1844, p. 175.

⁵ Syst. Nat., 1758, p. 66

⁶ Book of Antelopes, 1896, part V, pl. XXXI.

8. *Madoqua phillipsi*. Phillips's Dik-dik.

Six flat skins and four skulls (Nos. 3,901–3,904), the latter being in the collection of the Academy of Natural Sciences of Philadelphia.

9. *Oreotragus oreotragus ("Forst.," Schreb.). Klippspringer Antelope.

A mounted head and an entire skin of this antelope are in the University of Pennsylvania series.

10. ? *Kobus ellipsiprymnus (Ogilb.). Common Waterbuck.

One mounted head in the University of Pennsylvania exhibit.

11. *Kobus defassa (Rupp.). Defassa Waterbuck.

A skull is in the University of Pennsylvania series.

***12. *Cervicapra* sp. ?**

Two pairs of horns with portions of attached skulls indicate this genus too imperfectly to determine the species they represent.

13. *Gazella thomsoni*⁷ Gunth. Thomson's Gazelle.

Two skulls of males and two skins (Nos. 3,898, 3,934, 3,935, 3,994) were given the Academy of Natural Sciences of Philadelphia. The skull of a young male agrees exactly with Peters' figure⁸ of a young *granti* which Gunther made the type of *G. petersi*. A comparison with our series of *granti* and *thomsoni* convinces me that *petersi* is a young *thomsoni*.

14. *Gazella soemmerringi berberana (Mtsch.). Soemmerring's Gazelle.

Several specimens which adorn the University of Pennsylvania collection belong to this race.

15. *Lithocranius walleri* (Brooke). Waller's Gazelle.

Two skulls, male and female, (Nos. 3,896, 3,897), were presented to the Academy of Natural Sciences of Philadelphia. Three male heads are in the University of Pennsylvania series.

16. *Oryx beisa (Rupp.). Beisa Antelope.

Two mounted heads and four skulls in the University of Pennsylvania series. *O. callotis* Thos. does not seem to have been met with.

17. *Strepsiceros strepsiceros (Pall.). Greater Kudu.

The University of Pennsylvania contains one mounted head of this species.

⁷ Syn., *Gazella petersi* Gunth., Ann. Mag. N. H., 1884. p. 426.

⁸ Monatsb. Akad. Wis. Berl., 1879, p. 832, Pl. V.

18. *Strepsiceros imberbis Blyth. Lesser Kudu.

A head of this animal was taken by Dr. Smith. It is now beautifully mounted.

19. *Equus grevyi* M. Edw. Grevy's Zebra.

A remarkably large skull was added to the already fine collection of zebra crania in the collection of the Academy of Natural Sciences of Philadelphia. Its greatest length, from the anterior edge of the premaxillary to the superior rim of the occiput, measured in a straight line, is 633 mm. Its greatest zygomatic width is 220 mm. The alveolar length of the upper molar series is 170 mm., and the greatest length of mandible is 507 mm. The specimen is of an old male and, compared with a skull of *E. burchelli* of same age, is 100 mm. longer, and is nearly 50 mm. longer than the largest skull of *E. caballus* in the collection of the Academy of Natural Sciences of Philadelphia. Compared with that of *burchelli* the skull of *grevyi* is remarkably long for its width, due to the great relative prolongation of the rostral and occipital regions. In *burchelli* the length of skull is 2.63 times the width, in *grevyi* it is nearly three (2.88) times the width. The lower molar series differ markedly from *burchelli* in their uniformly massive size and great width, the same series in *burchelli* becoming much narrowed posteriorly. In the last named, the postpalatal fossa reaches opposite middle of $\overline{m. 2}$, in *grevyi* it barely reaches opposite the anterior alveolus of $\overline{m. 3}$.

20. *Rhinoceros bicornis L. Round-eared Rhinoceros.

Of the smaller two-horned species there is a mounted head and six pairs of horns in the University of Pennsylvania collection. With the exception of one pair, the horns more closely resemble those figured by Smith⁹ in his plate of *Rhinoceros simus* than those of *bicornis* figured by the same author on plate 2.

Dr. Smith informs me that while he encountered *R. simus*, no specimens were brought by him to this country.

21. *Procavia brucei somalica* Thomas. Somali Tree Hyrax.

An adult female (No. 3,818) taken at "Shebeli" September 4, 1894, and another female, two-thirds grown, taken March 3, 1894, fully confirm Dr. Thomas' diagnosis¹⁰ of this subspecies of *brucei*. Compared with an adult female specimen of *brucei* from the Kyahn Mountains, near Mount Kilima-Njaro, kindly loaned me by the

⁹ Illust. Zool. S. Afr.

¹⁰ P. Z. S., 1892, p. 71.

Smithsonian Institution, the paler sandy cast of the Somali specimens is very noticeable, and the dorsal spot is almost white instead of ochraceous. The difference in size of skulls, between the type and the subspecies, although the Shebeli specimen is the older, is very marked, but no specific distinctions are noticeable.

*22. *Elephas africanus* Blbch. African Elephant.

Ten small, and one large pair of tusks adorn the University of Pennsylvania collection.

23. *Sciurus* sp.?

An adult male specimen (No. 3,810) from Marsabit, taken September 11, 1895, differs in many particulars from any African squirrel which I can find described. It may be characterized as follows: Colors—Upper head, back and the slender tail, dull black, grizzled with tawny brown; half the hairs of back wholly black, the remainder black-based with light brown ring and black tip. Brown-ringed hairs more numerous on sides, giving a lighter shade to those parts. Upper and lower sides of tail colored alike, blacker toward distal end; hairs at base black with one to three light brown rings, terminal hairs longer and blacker with now and then a subterminal brown ring. Upper feet and scrotum rusty haired. Whisker patch, cheeks, line around eyes, chin, throat, breast, inside of legs, and a narrow abdominal line dirty tawny white or fawn. Ears sub-triangular, colored like back. Fur rather short and harsh. Whiskers sparse, weak, black. Color of sides encroaching on abdomen.

Measurements (from skin).—Total length 320 mm.; tail vertebræ 160; pencil 43; hind foot 40. Skull—Total length 40 mm.; greatest breadth 24; length of nasals 11; length of mandible 23.5.

This squirrel apparently comes nearest *S. poensis* A. Smith, but it lacks any trace of greenish color, is smaller and the tail and body are of equal lengths. Like *poensis* the five upper molars on each side are well developed and permanent.

It appears too small and dark for *S. cepapi* A. Smith. With any of the recently described species it seems to have no close affinities.

24. *Sciurus* sp.?

A young male squirrel in alcohol, from the Ganana River (February 18, 1895), is colored somewhat like *S. annulatus* Desm. and *S. cepapi* Smith. Like *cepapi* it has five upper molars, but unlike either of the above, its tail vertebræ are more than $1\frac{1}{2}$ times the length of the body without the head. The specimen is about two

thirds grown ; its total length is 269 mm., tail vertebræ 150, hind foot 37, tail tuft 40.

25. *Sciurus ganana* sp. nov. Ganana Jungle Squirrel.

Type, ad. ♀, No. 3,809 ; collection of Academy of Natural Sciences of Philadelphia, Dr. A. Donaldson Smith Collection ; taken February 18, 1895, on the Ganana River at Bar Madu.

Description—Size smallest (?) of the East African squirrels ; tail $1\frac{1}{2}$ times length of head and body ; head long and very slender ; ears large, rounded and somewhat pointed, without tufts. Fur soft and rather short. Above, uniform tawny ochre, faintly grizzled with black ; below, tawny white.

Upper tail colored like back, lower tail with broad mesial stripe of clear, rusty ochre.

The dorsal hairs are black-based and black-tipped, with a subterminal ring of ochre, as are also those of the upper head. On the sides the hairs are black at base with long ochre tips, and on the limbs and feet and sides of neck the ochre almost obscures (externally) the darker basal color. The tawny white hairs of lips, chin, throat, breast, abdomen and inner legs are unicolor to their bases. The region just above and below eyes is of the same color. The whiskers reach to tip of recumbent ears and are sparse and black.

The hairs of upper tail are ochre and black, ringed by four to six alternating zones of equal width, the basal one being ochre, the minute terminal one black. The lower mesial tail hairs appear to be uniform rusty ochre, but a glass reveals a narrow, subterminal black ring. The outer border and tip of lower side of tail is like the upper side.

The skull is remarkably narrow and deep for its length, the post-orbital process very short and blunt, the brain-case highly and narrowly arched and the audital bullæ widely separated from the pterygoid processes, owing to the strong, indented constriction of the inner anterior border of the bullæ. The auditory meatus is also compressed within the outer lateral plane of the overhanging squamosal. Upper molar series with permanent, cylindric pm. 2.

Measurements (taken by collector, in the flesh)—Total length, 320 mm. ; tail vertebræ, 170 ; hind-foot, 38 ; height of ear (from crown, dry), 9 ; tail pencil, 40.

Skull—Total length, 39 mm. ; basilar length (of Hensel), 32 ; greatest breadth, 21.5 ; greatest depth (occiput to plane of bullæ and incisors), 17 ; length of nasals, 11 ; post-orbital constriction (behind

processes), 12; breadth between auditory meatus (lower border), 15; greatest length of mandible, 22; greatest breadth of mandible, 14.

One specimen, a skin of an old female, with skull, in good condition, represents this distinctly marked little squirrel. So far as I am able to distinguish, it differs in size, color and cranial characters from any described species. Its relationships are with *S. cepapi*, but its smaller size, light color and high, narrow, brain case, with long compressed zygomæ, separate them.

On the accompanying label the specimen is stated to have been "shot in the thick jungle on River Ganana. Was accompanied by 4 young ones." The well-developed teats, 2 pectoral, 2 abdominal, 3 inguinal, show evidence of recent nursing.

26. *Xerus rutilus* (Cretzsch.). Abyssinian Spiny Squirrel.

Three adult skins, with skulls, from Hargesa, taken between the 17th and 28th days of July, 1894, are very similar in their colors, being tawny ferruginous, lined with black on crown and along middle back. The rostrum, sides of body and outer sides of limbs are a peculiar fleshy cinnamon, each hair being white tipped. Underparts white, with tawny cast due to exposed skin. Hind feet whitish above. Tail, above faded rusty, below brownish black with faded border. Hairs worn and ragged, with new, brown-black, white-tipped hairs sprouting beneath the old, but no evidences of molt on body.

In another specimen (Ad. ♀, No. 3,806), taken August 29, 1894, at Shebeli, the cinnamon of sides is almost obscured by the white hair tips, the back is clear, black-grizzled fawn and the hind head and limbs like sides. The tail in this specimen has quite recently molted and is a beautiful black above, broadly margined and tipped with glistening white. Below there is a mesial stripe of fleshy brown bordered with black and the latter is fringed with white, as above.

In a very old male, taken March 23, 1895, the back and hind head are much blacker, and the forehead, sides and limbs nearly chestnut-red; the whisker patch, throat and sides of head, neck and a narrow lateral marginal line, fulvous. The tail is in the molt to the black and white pelage and the old pelage is much darker (brown-black) than in the other specimens and lacks any sign of the mesial band.

Two, quarter-grown young, male and female, in alcohol, are colored like the adults on head and fore-limbs, the rest of the body above is sandy-brown, the outer tail hairs are dull white, the upper vertebral line of tail showing short black and rusty hairs. The tail (without hairs) is about the length of body without head. Its tip is blunt and the whole organ viewed from above is remarkably triangular, measuring across base, in the spirit specimen, about 10 mm. and tapering evenly to the point. The tail is much flattened and a strongly depressed vertebral line above and below separates the thickened, rounded fleshy sides. The external sexual organs of the young male are very strongly developed.

In adult suckling females the teats are very long (8 to 12 mm.), 2 abdominal, 2 inguinal.

Specimens in the collection of the Academy of Natural Sciences of Philadelphia.

No. 3,804	♂, El Dere,	March, 23, 1895.
No. 3,805	♂, Milmil,	July 27, 1894.
No. 3,806	♀, Shebeli,	August, 29, 1894.
No. 3,807	♀, Hargesa,	July 17, 1894.
No. 3,808	♀, Hargesa,	July 18, 1894.
No. 3,859	Juv. ♀, Hargesa,	July 18, 1894.
No. 3,860	Juv. ♂, Hargesa,	July 18, 1894.

27. *Lophiomy's smithi* sp. nov. Smith's Maned Rat. Plate XXV.

Type, Ad. ♂, No. 3,803, Museum Academy of Natural Sciences of Philadelphia. Collected at Sheikh Husein, West Somaliland (about lat. N. 8°, long. E. 41°), Africa, by Dr. A. Donaldson Smith, Sept. 30, 1894.

Description—Smaller than *L. imhausi*; tail shorter than body without head, not tufted. White crown and ear patch separated by a black band. Nasals narrow at base; interorbital width of frontals less than half their postorbital width. Jugal and frontal processes not separated by the squamosal.

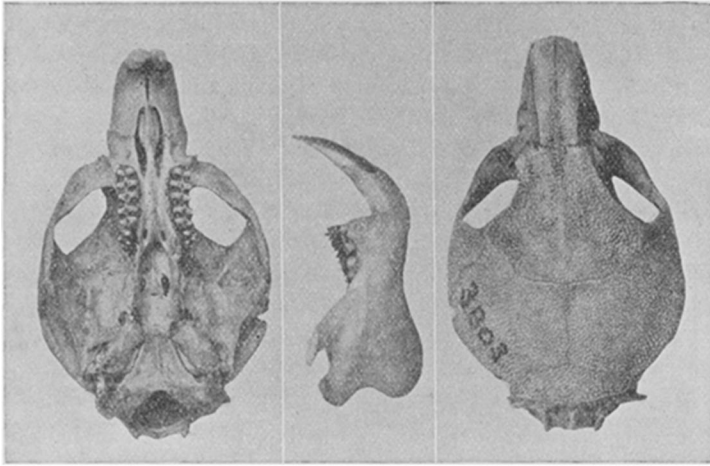
Color—above, from neck to base of tail and down to dividing lateral band of brown, iron-gray, the fur composed of two kinds: first, a very fine silken under fur about 20 mm. long, composed of white hairs, a few of which are wholly white but about 70 per cent. are brownish-black at the basal half. Among these are evenly interspersed, in the proportion of about one to eighty, slender bristling hairs, 60 to 65 mm. long. The basal fifth of these hairs is black,

followed by a similar length of white, then a much longer subterminal one of black, the tip being white. The same style of pelt and coloration is found on the sides, tail, belly and legs, except that the bristling hairs become fewer, almost disappearing on the shoulders and sides of neck and becoming obsolete on the underparts. The tail is unicolor, except a short white tip. There is a well-defined occipital band of black between the anterior bases of ears, forming a V-shaped extension into the middle of the white crown patch and connecting across the anterior base of ear with the black area of cheeks, nose, lower head and supraorbital stripe. There is a faint isolated patch of white half way up between the eye and the mouth, and a conspicuous patch of the same in front of and below each ear. The feet are sparsely clothed with coarse, black hair, becoming bristly on the toes and exceeding them in length. The whiskers reach almost to shoulders and are wholly jet-black. The backs of ears are very sparsely clothed with short brownish and white hairs, but their margins and inner surfaces are thickly set with bristly white hairs, 3 to 5 mm. long. The lateral band of short spinuous hairs, which divides the dorsal from the costal mane areas, begins broadly and sharply at the base of the neck on a line with the ear, and terminates indefinitely near the sacrum in a slender point of hairs. The larger of the hairs measure about 20 mm. long and are olivaceous brown, becoming rusty near the tips, with whitish subterminal ring and minute black tip. The median abdominal and pectoral areas are blacker than the sides.

Measurements (of body, taken in flesh before skinning, by the collector)—Total length, 380 mm; tail vertebræ, 140; hind foot 40; ear (from crown, dry skin), 12.5.

Skull—Total length, 52; basilar length (of Hensel), 46; greatest breadth, 31; interorbital constriction, 10; length of nasals, 16; greatest breadth (anterior) of nasals, 6.8; basal breadth of nasals, 5; length of upper molar series (alveolar), 12.2; length of mandible, 34; breadth of mandible, 15.2.

A fine skin of a male, with perfect skull, forms one of the most valuable treasures in Dr. Smith's collection. It was taken at Sheikh Husein, September 30, 1894, and is now mounted and deposited in the Museum of the Academy of Natural Sciences of Philadelphia. The skull forms a separate presentation (No. 3,803) in the Academy's collection.



According to Giglioli,¹¹ there were only four specimens of *Lophiomys* known to have been taken, up to 1881 :

1. Skin, skeleton and viscera (Aden, 1866). Type in Paris Museum.
2. Skull (Maman, 1867). Type of *Phractomys æthiopicus* Peters, in Berlin Museum.
3. Mounted skin and skeleton (Keren, Bogos 1870). In the Genoa Civic Museum.
4. Skin and skull (Erkanid near Suakin, 1881). In the Florence Zoological Museum.

Dr. Smith's specimen appears to be the fifth. It is certainly the first to reach an American museum.

Compared with Milne-Edwards' illustrations¹² of the type of *imhausi*, the Smith specimen is somewhat younger and smaller, with much shorter tail, though fully adult. The pelage is more worn or naturally shorter than in the type, and consequently is appreciably lighter colored throughout, owing to the more exposed bases of the fur. The tail almost wholly lacks the white tip, and the head the small white patch under eye, of *imhausi*.

The most marked color difference in the Sheikh Husein example is seen in the division of the white of upper head by a distinct black band joining the dark area of occiput with that of the side of head

¹¹ Zool. Anz., IV, p. 45.

¹² Archiv. du Mus., 1867, pl. VI and VII.

at the upper anterior base of ear. There is a large white spot 25 mm. long and 10 mm. wide reaching around lower base of ear to angle of jaw, and the ears are broadly tipped and fringed with white; both these characters not being shown in Milne-Edwards plate of *imhausi*.

Cranially, the Smith specimen differs specifically in its narrow interorbital width, the less produced expansion of the occipital region beyond posterior line of the interparietal and the almost complete suppression of the forward extension of the squamosal. In the type of *imhausi* this bone forms an exterior rectangular keystone about 3 mm. square, at the junction of the frontal, parietal and jugal bones, distinctly separating the superior wing of the jugal from contact with the lateral wing (postorbital process) of the frontal; in the Smith example these bones touch each other, being only separated anteriorly by a slender, irregular extrusion of the squamosal $\frac{1}{2}$ mm. wide and 2 mm. long.

The dentition of *smithi*, making allowance for the difference in age, appears to be almost identical with Edwards' figures¹¹ of *imhausi*, except that the posterior upper molar lies wholly outside the median longitudinal axis of the anterior molars. In the latter the nasals are broader posteriorly than anteriorly, these proportions being reversed in *smithi*. In *imhausi* the postpalatal notch is opposite anterior base of posterior molar; in *smithi* it only reaches the middle of that tooth. The paroccipital processes in *smithi* are directed forward against the audital bullæ; in *imhausi* they are directed backward and separated from the bullæ by a distinct space. The mandible of *smithi*, while exactly the same length as that of *imhausi*, is very much more slender, the greatest breadth of the latter being 4 mm. greater. The three recorded specimens¹² all came from a tract on the Red Sea north of the 15th parallel; *smithi* was taken on a mountain 5,000 feet high, in the Indian Ocean-drainage about 700 miles southeast of the most southern recorded locality of an *imhausi* specimen.

For an account of the capture of the specimen and of the nature of its habitat, the reader is referred to Dr. Smith's narrative.

28. *Acomys spinosissimus* Peters. Peters' *Acomys*.

A series of Spiny mice, taken between the 12th of March and the 17th of April, 1895, and preserved in alcohol, seem to correspond

¹¹ Milne Edwards' type was purchased alive at Aden. Its locality was apparently near that of the others, as they are regarded as the same species.

most closely to *spinosissimus*. One specimen (No. 3,872), a young adult male, resembles Peters' figure,¹⁴ except that it wholly lacks any rufous tinge on the uniformly olive-black upper pelage. The skull of this specimen is so like that of several others taken about the same time that I am induced to consider them the same species. Two very old adults (Nos. 3,868, 3,873), ♂ and ♀, are blackish-chestnut on back and upper head, and bright rusty cinnamon along the sides, the under parts and feet white. The total length of the old male is 195 mm.; length of the tail, 93; of hind foot, 17. The length of the skull is 29 mm., while that of the dark specimen (*l. c.*) is 2 mm. shorter. Two other hardly adult specimens (Nos. 3,863, 3,864) are somewhat intermediate in color between the dark and light examples, with which their cranial characters affiliate them. Their bellies and feet, however, are as white as in the old adults.

Briefly stated, this series, if representing one species, as I am inclined to think it may, indicates an animal, which in the old adult stage, is much redder above and whiter below than Peters's description of *spinosissimus*, which corresponds with the more immature forms. It is possible that the dark specimen only is referable to Peters's species and the others to some undescribed form.

The adult female contained three large embryos. As the animal grows older the tubercles on the feet become more prominent and interspersed with granulations. The two specimens from Finik near Webi Shebeli (Nos. 3,877, 3,878) are not different from the other rusty specimens. The young one is pale fawn and seems to show that the dark olive coloration is not a character of immaturity.

Specimens in alcohol; collection of the Academy of Natural Sciences of Philadelphia:

No. 3,863	♂, Aimola,	March, 12, 1895.
No. 3,864	♀, Lake Abaya,	May 10, 1895.
No. 3,865	♀, Aimola,	March, 12, 1895.
No. 3,866	♂, Ber Madu,	February 16, 1895.
No. 3,867	♂, Aimola,	March 14, 1895.
No. 3,868	♀, Aimola,	March 14, 1895.
No. 3,869	Foetal, Aimola,	March 14, 1895.
No. 3,870	Foetal, Aimola,	March 14, 1895.
No. 3,871	Foetal, Aimola,	March 14, 1895.

¹⁴ Reise n. Mossamb., 1852, pl. XXXIV, fig. 1.

No. 3,872	♂, Argasa,	April 17, 1895.
No. 3,873	♂, Aimola,	March 14, 1895.
No. 3,877	Juv. Finik,	December 14, 1894.
No. 3,878	♀, Finik,	December 14, 1894.

29. *Acomys* sp.?

A male specimen, (No. 3,862), the only one of this genus from Sheikh Husein, is lighter colored than any of the foregoing listed under *spinosissimus*, and the tail is not longer than the body. The ears are much larger than in any *Acomys* I have examined. The skull differs in the great width of the audital bullæ and the abrupt compression of the jugal at its squamosal insertion.

The total length of this mouse is 150 mm.; the tail, 60; the hind foot, 16.5; the ear from crown, 11.

30. *Acomys wilsoni* Thos. Short-tailed Spiny Mouse.

A spirit specimen of an old male, (No. 3,861), corresponds so exactly with Oldfield Thomas's description¹⁵ of *wilsoni* as to leave no doubt of its identity. The tail is only 47 mm. long; the body, 182; the hind foot, 13. The skull is 24.5 mm. long by 11.2 in breadth. The coronoid process is well developed as compared with the other *Acomys* in the collection.

This specimen was taken at Burga Camp, Amara.

31 *Steatomys parvus* sp. nov. Lesser Fat Mouse.

Type, No. 3,879, ad. ♀; collection of the Academy of Natural Sciences of Philadelphia. Collected by Dr. A. Donaldson Smith, July 14, 1895, at Rusia, Lake Rudolf, Africa.

Description—Size small, tail short and slender, less than one-third the length of head and body. Colors similar to *Steatomys pratensis* Peters (= *S. edulis* Ptrs.).

Above, uniform tawny brown, lined with black, slightly darker on back and hind head; sides more tawny. Underparts, including feet, uniform soiled white. Upper and lower tail, colored like corresponding parts of body. A white spot at base of ear.

Measurements—Total length, 107 mm.; tail vertebræ, 33; hind foot, 13; ear, from crown, 8.

Skull—Total length, 20 mm; basilar length (of Hensel) 17; greatest breadth, 11; interorbital constriction, 3.4; length of nasals, 7.8; length of upper molar series, 3.2; length of mandible, 11.3; breadth of mandible, 6.6.

¹⁵ Ann. Mag. N. Hist., 1892, p. 22.

Only one specimen of this genus is in the collection. It is an adult female with teeth well worn and showing plainly three pairs of teats, pectoral, abdominal and inguinal.

The specimen is in spirit. It differs decidedly from *S. pratensis* and *S. krebsi*, as figured and described in Peters' work on the mammals of Mozambique, in its diminutive size. Its tail is also relatively much shorter and the ears smaller than in either of these species. Its colors resemble those given in Peters' plate (*l. c.*) of "*edulis*," but lack the fawn tint of that species.

32. *Mus barbarus* L. Greater Striped Mouse.

Six specimens, all in alcohol, except an adult female, are in the collection of the Academy of Natural Sciences of Philadelphia. They may be tabulated as follows:

No. 3,846	Ad. ♀	Dumbola Kalta, . .	April 20, 1895.
No. 3,913	Juv. ♂	Lake Abaya, . . .	May 10, 1895.
No. 3,914	Juv.	Higo,	April 8, 1895.
No. 3,915	Juv.	Higo,	April 8, 1895.
No. 3,916	Juv.	Higo,	April 8, 1895.
No. 3,817	Juv.	Higo,	April 8, 1895.

33. *Mus microdon* Peters?

One specimen, (No. 3,908), a female, taken April 24, 1895, agrees very well with the figures of Peters' types, and the measurements also coincide very closely with his. The tail is unicolor, naked, shiny brown, tessellated with geometrically arranged scales. The belly and feet are whitish, the lateral stripe fulvous, the back dark, grizzled, brown-black.

34. *Mus* sp.?

Two immature males, (Nos. 3,884, 3,891), with plumbeous body, white feet and naked tail of the length of the body without head, comes from Sheikh Husein; October 12, 1894. They differ from any other species in the collection.

35. *Mus* sp.?

A series of four skins with skulls, and five specimens in alcohol, represent a pretty large rat which was only seen and taken on grassy hills at Sheikh Mahomet.

They correspond closely to the *Mus albipes* of Rüppell.

No. 3,848	♀,	
No. 3,849	♀,	November 9, 1894.
No. 3,850	♂,	November 4, 1894.

No. 3,851	♀,	November 7, 1894.
No. 3,883	Juv. ♀,	
No. 3,892	Juv. ♀,	November 1, 1894.
No. 3,893	Juv. ♀,	November 1, 1894.
No. 3,906	♂,	
No. 3,908	♀,	

Pseudoconomys Subgen. nov. Type *Mus proconodon* (infra).

Subgeneric characters. Alveolar length of anterior upper molar nearly thrice the greatest width of tooth. The two posterior sets of transverse tubercles of this tooth as in the genus *Mus*, but the anterior base of the median anterior cusp is remarkably produced forward one-third the whole length of the tooth, and terminates anteriorly just above the descending tooth root in a false, rounded tubercular cone, which lies so far below the grinding plane of the molars as never (?) to become functional.

36. *Mus (Pseudoconomys) proconodon* sp. nov. False-cusp Mouse.

Type, No. 3,880, ad. ♀; collection of the Academy of Natural Sciences of Philadelphia. Collected by Dr. A. Donaldson Smith at Sheikh Husein, Western Somaliland, Africa, October 13, 1894.

Description—Size small, tail minutely and sparsely haired, as long as body without head, unicolor, very slender and finely annulated. Pelage fine, silky, tricolor, mouse brown above, ochraceous-fawn along sides, beneath white. Anterior soles of feet thickly set with granulated points, the hind foot with two anterior, two median and two posterior tubercles, the fore foot with three anterior and two posterior tubercles. Ears very small and rounded.

Color above, including head and tail, almost exactly as in *Mus musculus*, the sides slightly tinged with fawn. A well defined reddish-fawn stripe along sides, from shoulder to hip-joint, distinctly separates the color of back from the pure white of belly. Whole of under side, including upper lips, pure clear white to the bases of the hairs. Feet whitish-brown; soles naked to heel. Mammæ, 2 pectoral, 2 axillary, 2 abdominal, 2 inguinal. Skull characters as above defined for the subgenus.

Measurements—Total length, 128 mm.; tail vertebræ, 56; hind foot, 16; ear, from crown, 6.

Skull—Total length, 22; basilar length, 19; greatest width, 11; interorbital constriction, 4; nasal length, 8.8; alveolar length of upper molar series, 4.2; length of mandible, 13; greatest width of mandible, 6.4.

One specimen in alcohol represents this distinctly marked species. Should it prove that its peculiar tooth pattern is shared by some previously named but imperfectly described species, the propriety of its subgeneric (if not generic) value certainly justifies the possible synonym. The specimen is an old adult with the teeth well worn, but not enough so to destroy the pattern of tuberculation exhibited by earlier maturity.

37. *Mus minutoides* Smith. Smith's Lesser Mouse.

I follow Oldfield Thomas¹⁶ in applying Smith's earlier name to a small, fawn colored mouse which corresponds to Peters' admirable figures of *Mus minimus* in his Mammalia of Mozambique.

Specimens (in alcohol) :

No. 3,910 Juv. ♀, Sogida Volcano, . . April 7, 1895.

No. 3,911 Juv. ♂, Sogida Volcano, . . April 7, 1895.

No. 3,912 Ad. ♂, Jire, Sakuyu, March 20, 1895.

38. *Mus mahomet* sp. nov. Sheik Mahomet Mouse.

Type, No. 3,881, ad. ♂ ; collection of the Academy of Natural Sciences of Philadelphia. Collected by Dr. A. Donaldson Smith at Sheikh Mahomet, Western Somaliland, Africa, Nov. (?), 1895.

Description—Size small, slightly larger than *Mus minutoides* (*l. c.*). Tail well haired, slender, nearly equal to length of head and body. Ears small, rounded and thickly haired ; pelage dense, slightly hispid, tricolor.

Color above, dark, black-brown, becoming dark fulvous brown on sides and lower cheeks. Lower parts grayish-white, tinged with fulvous on breast, neck and throat. A distinct lateral band of deep fulvous extends along sides from shoulder to hip and along ham almost to heel, separating the colors of upper and lower body. Feet hoary brown ; tail above, like back, below, like feet. Basal halves of body hairs everywhere bluish-black. Hind feet with three pairs of tubercles, fore feet each with three anterior and two posterior tubercles. Whiskers medium, black.

Skull as in typical *Mus musculus*, except that the inner anterior face of upper incisors is flattened and the bases of nasals extend some distance beyond the upper posterior sutures of the premaxillaries. Coronoid process of mandible strongly hooked.

Measurements—Total length 103 mm. ; tail vertebræ, 49 ; hind foot, 14.5 ; ear, from crown, 6.5.

¹⁶ P. Z. S., 1888, p. 13.

Skull—Total length, 19.3 mm. ; greatest breadth, 9.8 ; interorbital constriction, 3 ; length of nasals, 7.2 ; length of mandible, 11.5 ; width of mandible, 5.7.

Two specimens of this minute mouse, both males, taken at Sheikh Mahomet, appear to be undescribed. In some respects they resemble the characters given by Rüppell for *Mus imberbis*, but they are much smaller with relatively longer tails and have well developed whiskers.

The so-called whiskerless character of Rüppell's animal appears to me to be an anomaly due to abnormal rather than natural circumstances. In any event, this question in no wise affects the status of the mouse which owes to an accident of birth and locality, rather than to its possession of whiskers, the august specific name which I have imposed upon it.

39. ?*Mus arborarius* Peters. Long-tailed Wood Mouse.

Two specimens, both females, (No. 3,847, ad. skin and skull ; No. 3,890, juv. in alcohol), from River Darde, September 12, 1894, are of interest.

Mr. Oldfield Thomas considers¹⁷ *M. arborarius* of Peters synonymous with *M. dolichurus*. If this is the case, the River Darde mice are perhaps, a good subspecies characterized by the excessively long tail and smaller size. In our oldest specimen (No. 3,847), with molars more worn than in the adult type skull of *arborarius* figured by Peters,¹⁸ the skull is markedly smaller and shallower.

After examining their descriptions it seems to me that Peters has plainly set forth good distinctions between his *arborarius* and Smuts' *dolichurus*. The most marked character of *arborarius* is the pure white feet and belly, which in *dolichurus* are fulvous. The absence of a preocular spot in *arborarius* is also to be considered. In these respects the Smith specimens resemble *arborarius*. The feet and under parts are immaculate white to the roots of the hairs.

In the adult, the total length is 100 mm., that of the tail vertebræ being 150 mm. In the younger one, contrary to the general rule in young murines, the proportional size of tail to head and body is even greater than in the adult, the former being 122 mm. long and the latter 76 mm.

In the type of *dolichurus* the length of head and body is 125 mm. and the tail 145 mm. In *arborarius* the head and body of the female

¹⁷ P. Z. S., 1891, p. 186.

¹⁸ Reise n. Mossam., 1852, pl. XXXV, fig. 7.

is given by Peters as 120 mm., of the tail, 160 mm. These figures, combined with the color differences, convince me of the propriety of separating *arborarius* from *dolichurus*, and at the same time classing the River Darde specimens with the former species. The character of the tail in the alcoholic specimen seems to indicate clearly its use as a prehensile organ.

40. *Lophuromys sikapusi* (Temm.). Sikapusi Rat.

Making allowance for the change of color likely to occur in spirit specimens, there is no doubt that two hispid rats taken by Dr. Smith at Sheikh Mahomet are specifically the same as the animal minutely described by Peters¹⁹ as *Lasiomys afer*.

The upper pelage of No. 3,909, a very old female, is like that of the younger one (No. 3,894, ♀), a grizzled, black, reddish-brown, the under parts light ochraceous sharply defined against dark color of sides. The tail of the older specimen is wanting; in the other one it is deep black above and rusty below. The basal half of upper pelage is colored like belly, the belly hairs being unicolor. The older specimen is very large, the head and body being 130 mm. long.

The skull, compared with Peters' illustration (*l. c.*), differs in the shape of the pterygoid fossa which, in our examples, is widest at the postpalatal notch and contracts at the pterygoid processes, widening again in a vase-shaped outline as viewed from above.

The semi-spinous character of the pelage in this species is intermediate between that of *Mus* and *Acomys*.

41. *Golunda reichardi* (Noack). Reichard's Bush Rat.

Six fine skins and one specimen in alcohol, of a "grass or bush rat," were taken at Sheikh Mahomet. They answer Noack's description of *reichardi*,²⁰ as contrasted with that of Peters for "*Pelomys fallax*," so well that I cannot hesitate to assign them to the former and confirm the correctness of Noack's separation of the two. The entire absence of a sulcus from the incisors of any of our specimens instantly distinguishes them from *fallax*. The black dorsal streak is plain in some, in others nearly absent.

The general body color may be said to be ochraceous to tawny brown, grizzled coarsely with black. Sides of nose and eye-ring pure ochraceous.

A note on one of the labels states this rat "makes a prehensile [*sic.*] nest in bush; habitat in thick grass."

¹⁹ Monatsb. Akad. Berl., 1866, p. 409.

²⁰ Zool. Jahrb., 1887, p. 235.

Specimens: Nos. 3,820, 3,821, 3,822, 3,823, 3,824, 3,825, 3,920: = 5 ♂ s, 2 ♀ s.

42. *Dendromys mesomelas* (Brants). Long-tailed Tree Mouse.

Three *Dendromys*, all apparently taken at Sheikh Mahomet, were presented to the Academy of Natural Sciences of Philadelphia by Dr. Smith. Two of these, a half-grown young (No. 3,876) and an adult male (No. 3,874), are in spirits; the third, an adult male (No. 3,853), is a finely prepared skin with skull, and field measurements taken by the collector. The two adults correspond so exactly with Smith's beautiful plate²¹ of *D. typicus*, in both color and dimensions, I am unable to note any differences of even sub-specific value. The fact that *typicus* is a South African species would lead to the supposition that the Galla animal differed therefrom. In the absence of specimens for comparison, these will be classed under *mesomelas*, Wagner, Heuglin and Trouessart agreeing that *typicus* is a synonym of that species. Matschie²² names the long-tailed *Dendromys* of East Africa *D. pumilio* Wagner, quoting "*Munch. gel. Anz.*, XII, 1820, p. 437." I am unable to find this publication, but would suppose some mistake, as Wagner states three times in his description of *pumilio* in Weigmann's *Archiv. fur Naturgeschichte*, 1841, p. 135, that it is a "new species," no reference being made to a previous description. The chief distinction between *pumilio* and *mesomelas* (if any, Trouessart and Heuglin considering them the same) is the absence of the dark dorsal stripe in the former.

From *D. mystacalis* Heugl.,²³ of Abyssinia, the Sheikh Mahomet specimens are distinguished by greater size, relatively longer and less hairy tail and the presence of the dark dorsal stripe.

In No. 3,853 (*l.c.*) the total length is 177 mm.; tail, 100; hind foot, 21. In No. 3,874 these measurements are respectively 163, 92 and 22; the ear from crown is 11.5.

43. *Dendromys* sp.

A young spirit specimen (No. 3,876), whose skull shows it to be about two-thirds grown, differs so markedly in the black color of the ears and orbital region and the white spot at the bases of ears and the tail being only equal to the head and body in length, that there is little doubt of its belonging to a different species from the

²¹ Illust. Zool. S. Afr., 1849, pl. 34, fig. 1.

²² Die Saug. Ost Afr., 1895, p. 49.

²³ Nov. Act. Acad. Cæs. Leop., 1863 (Sept. 1862), p. 5.

foregoing. Its date, November 12, 1894, would show it to have been taken at Sheikh Mahomet.

44. *Gerbillus* sp.?

Two examples (No. 3,858, 3,929), both females of early maturity, the former taken on the route to, and the latter at, Lake Rudolf, come nearer *G. schlegeli* than to *G. böhmi* or *G. leucogaster*, with which they also seem closely allied. They are darker and smaller than *leucogaster*, and have much larger audital bullæ than *böhmi*.

A. Smith considers *G. afer* of Gray a synonym of *G. schlegeli*. In this connection I may remark that the above specimens correspond almost exactly to Smith's plate (pl. 35) of *afer* in the *Illustrations of the Zoology of South Africa*.

45. *Gerbillus* (sp. nov?).

So desperately involved is the nomenclature and classification of the numerous African members of this genus, I hesitate to impose a name on what appears to me an undescribed form, No. 3,857, Ad. ♀, from Hargesa, taken July 18, 1894. While resembling, in general characters of skull and skin, Peters' *leucogaster*, it is essentially different from any *Gerbillus* I have examined, in the entire absence of the posterior cusp of m. 3, that tooth consisting merely of the normal semicircular loop with anterior curve and single posterior crenation. The tooth is not much worn, so that any trace of the posterior cusp would be easily distinguished, neither is there the faintest indication of it at the base of the tooth, the posterior crenation nearly reaching the alveolus.

The specimen is a dry skin; the upper body colors are a rich, dark fawn, becoming tawny along sides and lined along upper back and head with coarse black-tipped hairs. The ears and upper tail are blackish-fawn, the latter becoming nearly black toward tip and ochraceous white on the lower side. The feet and under side of body, including lower cheeks and upper lips, white to the bases of hairs. Shorter whiskers white, longer ones blackish. Bases of upper body hairs light slate.

The measurement of the dry skin gives the total length 280 mm.; the tail, 155; the hind foot, 37; the ear from crown, 14. The skull is 60 mm. long and 20 wide, the nasals 16 long and very slender, the supraorbital bead very strong and with an anterior flange. The ascending ramus of the lower jaw is longer and more erect than in *leucogaster* and its allies. The audital bullæ are large, as in *leucogaster*, but the auditory meatus is compressed.

46. *Gerbillus* sp.?

Three young specimens (Nos. 3,854, 3,855, 3,928), two in skins and one in alcohol, all taken at Sheikh Husein, October 12, 1894. I am unable to even conjecture about, except to say they differ specifically from any others in the collection.

They are about two-thirds grown; the tail is just equal to head and body in length, and the size of skull and hind foot would indicate a species smaller than *leucogaster*. This species is remarkable for the blackness of the ears, back, rump, upper tail and soles of the feet. The upper ground color is brownish-fawn fading to purer fawn on the sides. The underside and feet are clear white.

No. 3,855 measures 180 mm. in length; tail, 90; hind foot, 30. The skull is 27 mm. long.

47. *Gerbillus pulvinatus* sp. nov. Cushioned Gerbillus.

Type, No. 3,930, ad. ♂; collection of the Academy of Natural Sciences of Philadelphia. Collected by Dr. A. Donaldson Smith at Rusia, Lake Rudolf, Africa, August 5, 1895.

Description—Size medium, tail with pencil nearly $1\frac{1}{2}$ times length of head and body. Soles and toes of fore and hind feet cushioned throughout with hairs like those of the upper surfaces of the feet.

Color (from type alcoholic specimen) above, from hind nose to tail, fawn, sparingly lined with black tipped hairs, much blacker across hind rump and thighs. Upper tail fawn, becoming blackish-brown toward penicillate tip, the underside white almost to tip. Hind feet, including lower portion of hind leg, white; forelegs and feet, lower parts, including sides, lower cheeks, upper lips, to eyes, nose, hinder bases of ears, superciliary stripes and spots between eyes and ears, white, the white greatly encroaching on the paler fawn of upper sides and lower outer half of hams. Ears fully and coarsely haired on outer surface with golden fawn anteriorly, becoming darker on the hinder parts.

Skull (teeth worn, 3 anterior cusps of *m.* 1 yet distinct); first section of *m.* 1 consisting of a single rounded oval cusp, without fold or division and distinct from its neighbor; second (median) transverse section of same tooth consisting of two distinct circular cusps of equal size; third (posterior) section of same is a single elliptic transverse cusp forming the widest portion of the tooth. Audital bullæ large, tumid, widely separated from the slender basi-occipital. Incisive foramina not reaching anterior plane of molars.

Measurements—Total length, 234 mm.; tail vertebræ, 135; hind foot, 26.5; ear, from crown, 10.

Skull—Total length, 30.6 mm.; basilar length, 25; greatest width, 16; interorbital constriction, 6; length of nasals, 12; length of upper molar series, 4; length of mandible, 16; width of mandible, 7.8.

An old adult male, in spirit, which I have made the type, two immature specimens, male and female (Nos. 3,926, 3,925) also in spirit, and another immature specimen, a skin with skull (No. 3,856) fully represent a species which was collected on the route to and from Lake Rudolf between June 2d and August 5, 1895. The more pallid pelage of the dry skin would indicate it either to be a desert race of the type or that the specimens in alcohol of same age have become darkened by their immersion. In either case the species is lighter colored than any other in the collection. I have ventured its separation because of the remarkable and apparently unique character of the hairy-soled feet. This is quite as marked in the old as in the young. These sole hairs form a sort of cushion on and just behind the anterior tuberculated part of the hind and fore feet, and even the plantar excrescence of the heel is furnished with scattering bristling hairs. The toes are almost as fully haired beneath as above. The character of the tuberculation of m. 1, as above given, is also strongly diagnostic.

48. *Gerbillus ruberrimus* sp. nov. Little Red Gerbillus.

Type, No. 3,927, ad. ♂; collection of the Academy of Natural Sciences of Philadelphia. Collected by Dr. A. Donaldson Smith at Finik near Webi Shebeli, Somaliland, Africa, December 14, 1894.

Description—Size smallest (?) of the African species of the genus. Tail nearly $1\frac{1}{2}$ times the length of head and body; color above brilliant red-brown to orange-yellow. Ears relatively very small and round.

Color (of type) above, clear rich reddish-cinnamon with slight admixture of black tipped hairs. Sides scarcely paler, a strong line of demarkation between red of upper and white of lower parts. Base of ear, patch over eye, upper lips, feet and under parts pure white; ears well haired and colored like upper head. Tail unicolor, reddish-fawn throughout, becoming blackish on the distal, penicillate hairs and terminal tuft.

Skull—Basi-occipital and audital bullæ but slightly separated; incisive foramina not reaching the anterior plane of molar series.

Anterior cusp of m. 1 strongly indented by an enamel fold on the anterior inner face and connected by a continuous enamel wall with inner median cusp of the same tooth. Outer median cusp of m. 1 isolated. Inner and outer cusps of transverse sections of m. 2 and m. 3 coalescent. Single anterior and median pair of cusps of m. 1 forming a coalescent trefoil.

Measurements—Total length 160 mm.; tail vertebræ, 95; hind foot, 20; ear, from crown, 6.

Skull—Total length, 24 mm.; greatest breadth, 12.5; interorbital constriction, 4.5; length of nasals, 9.8; length of mandible, 12; width of mandible, 5.

The type above described, is in alcohol and is a well-aged individual with teeth worn half way to the cusp bases. Another specimen (No. 3,852) a dried skin with skull, taken on the same day as type is an adult, but less aged, female. It differs only in being deep ochraceous instead of being reddish above.

Compared with *G. pusillus* Peters,²⁴ to which it appears most nearly allied, the type of *smithi* is distinguished by its splendid red color, by the very small ear, relatively longer tail and smaller body. The skull is of the same length as that of the type of *pusillus*.

49. *Otomys irroratus* Brants. Brants' Otomys.

A young specimen, labeled from Sheikh Mahomet, was brought back in alcohol. It is a female and apparently about two-thirds grown. It is light brown, darkly grizzled with black, the tail deep black above, its underside being grayish. The hind feet are black with brownish hairs along the outside near heel. The upper incisors have two distinct (median and inner) anterior grooves and a slightly concave flattening of the convex intervening space. The lower incisors present one deep groove dividing the face of the tooth into an outer third and an inner two-thirds; along the inner edge of the tooth face is a faint sulcus, and the intervening convexity is faintly flattened medially. Owing to the immaturity of the tooth these sulcations are less strongly developed than would ensue with greater age, the fainter grooves only appearing at the alveolar surface.

50. *Heterocephalus glaber* Rüpp. Hairless Mole Rat.

An old adult female (No. 3,923) in perfect condition, preserved in alcohol, is included in the exceptionally fine collection of small

²⁴ Monatsb. Acad. Berl., 1878, p. 201.

rodents brought back by Dr. Smith. It was taken at Milmil, Somaliland, July 24, 1894. It appears to be the third recorded specimen in existence and the second belonging to the type species of this remarkable genus. Rüppell's type of *glaber* came from Shoa and was described²⁵ in 1845. It now exists in the Senckenburg Museum in the form of a mounted skin with the skull separate, the mandibles missing. In 1885 E. Lort Phillips sent another specimen of *Heterocephalus* in spirits to the British Museum from Central Somaliland. This was made the subject of a communication by Mr. Oldfield Thomas before the London Zoological Society, and in the *Proceedings* of that Society²⁶ was described as new under the name *phillipsi*, after its discoverer. Subsequently Mr. Thomas published²⁷ a more complete account and description, with figures, of the new animal, and made detailed comparisons with *glaber*.

It was with no small curiosity that, after having a photograph made of Dr. Smith's specimen, I removed the skull and compared it with the figures of Rüppell and Thomas. Except in its greater age and size there are no differences between the animal from Milmil and the Shoa type.

The color of the skin is pale ochraceous with a fleshy tinge, becoming pale livid on the upper sides of head, neck, belly, rump and tail. The scattered hairs are a silvery, transparent white. The underparts are somewhat lighter than the upper. The skin of head is very thick and tough, more so for example than that of the oldest and toughest *Mus decumanus* that I ever dissected. The inner finger of manus is much shorter relatively than figured by Thomas for *phillipsi*. Two mammæ 15 mm. apart are faintly indicated at the sternum immediately between the fore legs when they are drawn down at right angles to the body. A series of seven pairs of teat-like excrescences, each bearing in its pitted center a bristling hair 5 mm. long, extend along the sides to the groin in the position of the regular teat series.

The "wrinkled, warty" appearance of the skin, which Mr. Thomas thinks may be due to the action of spirits on the specimen of *phillipsi*, I am confident is perfectly normal, as our specimen plainly indicates in many ways, and it will be seen that these pits, warts and furrows are closely correlated with the anatomy of the animal

²⁵ Abhand. Mus. Senckenb., p. 99.

²⁶ P. Z. S., 1885, pp. 611, 612.

²⁷ Ibid, 1885, pp. 845-849.

as it exists in life and with the skin coloration and the distribution of the pelage.²⁸

The skull of the Milmil animal is from $1\frac{1}{2}$ to 2 mm. larger in its exterior dimensions than that of the type of *glaber*. It belongs to a much older animal, and on this account the differences in dimensions and formation of the teeth are, perhaps, largely attributable. Among these the most noticeable are found, 1st, in the upper incisors each bearing upon their inner anterior surfaces a distinct shallow sulcus, bordered on the inner side by a sharp ridge and merging outwardly into the convexity of the lateral two-thirds of the face of tooth. Rüppell states clearly that his animal had unchanneled incisors; Thomas says the incisors of *phillipsi* are "somewhat flattened and bevelled on their interior halves," but does not define a sulcus. The upper molars of the specimen in the Academy of Natural Sciences of Philadelphia number six, as in *glaber*. Unlike those figured for *glaber* their crown surfaces are of unequal dimensions, m. 2 being one-third larger than m. 1 and m. 3 considerably smaller than m. 1. In the two first upper molars the crowns have worn down until the enamel folds are obliterated. In the last, which evidently erupted at a much later date than the anterior pair, the crown shows a trifoliate surface, due to the impinging of the enamel walls of the lateral and posterior sides of the tooth nearly to its center. Of the three mandibular molars, m. 2 and m. 3 are about equal in size, m. 1 being about half as large; the latter is circular in outline and shows no enamel folding; in m. 2 there is a pretty deep indentation on the outer wall and a shallow curve of the inner; in m. 3 these indentations are exaggerated, nearly equal, and nearly divide the tooth into two sections, the anterior section being rectangular, the posterior hemispherical in outline. If we were to apply the standard of specific separation generally recognized to-day as governing the classification of rodents, it would be consistent, perhaps, to make the third specimen of *Heterocephalus* a third species on the dental characters above defined, and on similar grounds establish a new genus for the light-molared *H. phillipsi*, but I fully agree with Mr. Thomas that the known individual variations in other species of the *Bathverginae* are quite as marked as any yet attributed to *Heterocephalus*.

²⁸ A plate of the specimen is being prepared for Dr. Smith's book on the Expedition.

The measurements of Dr. Smith's specimen are as follows—Total length, 143 mm.; tail vertebræ, 42; hind foot, 24²⁹; fore foot, 16.

Skull—Basilar length (of Hensel), 23.5 mm.; end of nasals to occipital ridge, 23; zygomatic width, 20.5; interorbital constriction, 6.5; length of nasals, 9.8; base of upper incisors to m. 1, 9; length of mandible, 22.2; breadth of mandible, 15.

52. *Rhizomys splendens* (Rüpp.). Lesser African Mole Rat.

A specimen (No. 3,924) of a male Mole Rat, from "Gineer," (Gineh?) preserved in alcohol, is in the collection. Its size and coloration place it with the first species described by Rüppel from Dembea.

53. *Pectinator spekei* Blyth. Brush-tailed Rat.

A pair of these interesting rodents, male and female, (Nos. 3,921, 3,922) taken at Sheikh Mahomet, December 4, 1894. They correspond closely to Blyth's original diagnosis of the type taken in eastern Somaliland.

The female, a full aged adult, measures (from spirit specimen) 190 mm. in total length; the tail, 30; the hind foot, 36; the ear, from crown, 10.

54. *Lepus* sp.?

An apparently young hare (No. 3,811) without skull, and labeled "The Haud," July 22, 1894, is the only representative of this genus. Its alliance seems to be with *L. ochropus* Wagner, as quoted by Matschie in the Mammalogy of East Africa.

***55. *Felis leo somaliensis* Noack.** Somali Lion.

Two very fine skins of male and female are in the University of Pennsylvania exhibit.

***56. *Felis pardus nimr* (Ehrenb.).** Steepe Leopard.

Five leopard skins in the University of Pennsylvania exhibit may be classed with the form designated by Ehrenberg and revived by Matschie.

57. *Felis caracal nubica* (Fitz.). African Caracal.

A half grown specimen (No. 3,931) of a male taken October 2, 1895, is in the collection of the Academy of Natural Sciences of Philadelphia.

²⁹ The hind foot of *glaber* is given as 21.2 mm., but the fact of its being taken from a dried specimen would largely account for the difference in size.

58. *Felis maniculata* Rüpp. Manacled Cat.

A flat skin, (No. 3,812) with accompanying skull, of a fully adult animal, corresponds exactly with Rüppel's³⁰ figure of *maniculata*, of which name I consider *caligata* a synonym. It would appear that *F. cafer* ("caffer" Auct.) of Desmarest is a distinct species.

*** 59. *Cynailurus jubatus guttatus* (Herm., Hamm.). African Cheetah.**

A flat skin is in the University of Pennsylvania library donation.

60. *Helogale undulata* (Peters). Undulated Mongoose.

An adult and a young female (Nos. 3,815, 3,816), the latter from Hargesa, July 21, 1894, the former taken March 3, 1895, are similar in their deep chocolate tints as compared with Peters' plate and Thomas'³¹ diagnosis of the typical form. The young animal is grayer and more tawny than the adult above, but the lower parts of the two are very similar.

61. *Herpestes gracilis ochraceus* (Gray). Abyssinian Mongoose.

The skin and skull of an old male *Herpestes* (No. 3,817), taken November 25, 1894, shortly after leaving Sheikh Mahomet, evidently belong to the Abyssinian animal, which Mr. Thomas considers a variety of *gracilis*. Compared with Gray's plate of *ochraceus*, the Smith specimen is redder and more darkly annulated with black. The form and color pattern of the tail is very similar to Gray's in our specimen, except that the slender portion adjoining the black tip is bright rusty. The black tip is about 35 mm. long.

The following legend appears on the label attached to this skin: "Shot in amongst bushes. It eats insects, and had a dragon-fly in its mouth when shot. Irides yellow."

62. *Genetta tigrina* (Schreb.). Tiger Genette.

Accepting Matschie's identification³² of Mr. True's diagnosis³³ of a Genette from Kilima-Njaro to belong to *tigrina* instead of *pardina*, I am induced to place a skin and skull from Milmil under the former name. The black of posterior hind legs and feet and the bristling black dorsal mane and rufous-centered body-markings place it with *tigrina*. The specimen is an old female, No. 3,844. The skull is 86 mm. long and 40 broad.

*** 63. *Hyæna crocuta* Erxl. Spotted Hyaena.**

A mounted skull is among the University specimens.

³⁰ Reis. N. Afr. Zool., 1826, p. 1, pl. 1.

³¹ P. Z. S., 1882, p. 80.

³² Säugeth. Ost Afr., 1895, p. 74.

³³ Proc. Nat. Mus., 1892, p. 454.

64. *Canis mesomelas* Schreb. Black-backed Jackal.

A skin of this species in the University of Pennsylvania is represented by a skull (No. 3,845) in the collection of the Academy of Natural Sciences of Philadelphia. Locality not given.

65. *Mellivora ratel* (Sparrm.). Ratel.

A skin with skeleton (No. 3,814) was received by the Academy of Natural Sciences of Philadelphia. Another skin was retained by Dr. Smith. They both came from Gebas near the Shebeli, and were taken January 6, 1895.

66. *Erinaceus albiventris atratus* subsp. nov. Galla Hedgehog.

Type—No. 3,831, Yg. Ad. ♂; collection of the Academy of Natural Sciences of Philadelphia. Collected by Dr. A. Donaldson Smith at Ngare Nohor, Lake Rudolf, Africa, August 26, 1895.

Description—Similar to *E. albiventris* Wagner, as defined by Dobson,³⁴ but with hoary black limbs, feet, tail, ears and face-patch, the remaining pelage pure, clear white. Extreme tips of spines sooty black.

Color—Spinous region covered evenly with spines 20 mm. long, whose extreme tips are dusky, followed by a subapical zone of dull white 5 mm. wide, then by a horn-black zone 8 mm. wide, fading into a lighter zone and darkening again into a black base. Facial area, bounded by edges of upper lips and lines drawn from corners of mouth to eyes and thence connecting across forehead, thinly-haired anteriorly by sooty black, more thickly and lengthily haired posteriorly, and with a decided moustache below eye across cheeks, of pure black. A triangular spot of black on lower lips and chin, to corners of mouth. Region between dark facial patch and spines of hind-head and ears, cheeks, throat, breast, belly and sides nearly to ventral region, pure silky white with an occasional black hair. Fore-legs from body to feet black, well intermixed with white, especially on inner side of arm. Fore-feet and soles black with a few gray hairs. Hind-limbs and feet colored like fore-limbs, with a decided whitish patch on inner side of pes near heel. Tail and vent hoary black. Formation of feet as is minutely described by Dobson for *albiventris* (*l. c.*). The rounded, thickly-haired ears, grayish, sooty black, inside and out.

Measurements (of type by collector in field)—Total length, 118 mm.; tail vertebrae, 10; hind-foot 23; ear from crown (dry) 13.5.

³⁴ Monog. Insectiv., 1882, p. 11.

Skull: total length, 35; zygomatic breadth, 22; interorbital constriction, 10.6; length of nasals, 11.8; length of mandible, 27; breadth of mandible, 12.

The immaturity of the specimen which I have made to represent this newly-described race of *albiventris* can in nowise account for its color characters as contrasted with the typical form, whose habitat Dobson places as "northern tropical Africa." In appearance, as well as in habitat, this race may be said to show some approach to the South African *E. diadematus* Fitz., but closer examination shows its affinities to be with the northern animal.

The single skin and skull brought back by Dr. Smith indicate an individual closely approaching maturity, the posterior molar and the canine just cutting through the gums.

67. *Macroscelides rufescens* Peters. Rufescent Jumping Shrew.

This shrew, whose cranial characters so closely ally it to *M. in-tufi* Smith, is represented by an adult female and an immature male (Nos. 3,829, 3,830), taken respectively at Ehrer and Lammo on the 12th and 16th of August, 1894. The adult is somewhat blacker and less ruddy than Peters' specimens, but the measurements and color pattern are identical. Both specimens are skins with skulls, full data and measurements.

68. *Macroscelides* sp. ?

A half-grown individual (No. 3,828), labeled Walenso, October 26, 1894, is so dark and has such a short tail compared with body that it is probably distinct. Its skull, however, shows near relationship to *rufescens*. It is preserved in alcohol.

69. *Crocidura doriana* Dobson. Shoa Shrew.

An alcoholic specimen of an adult shrew (No. 3,826) in the collection was taken at Sheikh Mahomet, October 28, 1894. The skull and dentition are identical with Dobson's Shoa species as figured in the Monograph.

70. *Crocidura* sp. ?

A rather young example (No. 3,827), in alcohol, from Lake Rudolf, the skull of which, unfortunately, was lost after being extracted for examination, is of interest. The skin and sparse hairs of tail and feet are white. Tail about half the length of head and body. Color of body dark bluish-gray, lighter beneath. Total length about 100 mm., hind-foot, 12.5. Ears conspicuous. The small size of this specimen makes it improbable that it is *C. leucura*

Matschie, its immaturity not being sufficient to account for the different measurements.

71. ? *Cercopithecus rufoviridis* Is. Geoff. Reddish-green Guenon.

A skin with skull (No. 3,932) separate, of a not fully-mature monkey, agrees somewhat with the species above-named. Its resemblance to *C. flavidus* Peters, from Mozambique, which Forbes³⁵ considers a synonym of *rufoviridis*, is quite close. On the label is written : "Skin, pale Prussian blue ; face skin brown ; irides light brown."

72. *Colobus guereza* Rüpp. Mop-tailed Guereza.

Three skins and one skull (No. 3,899), taken at Lake Rudolf, were brought to America. One of these was subsequently mounted for the University of Pennsylvania. Another skin (No. 3,905) is in the Academy of Natural Sciences of Philadelphia series. They are all typical *guereza*, as described and figured by Rüppell.

³⁵ Allen's Nat. Lib., II, 1894, p. 65.



LOPHIOMYS SMITHI RHODES.